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Indian Standard
GLOSSARY OF TERMS RELATING TO OILS AND FATS

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NEW DELHI 110002

Gr 8 *June* 1986

Indian Standard

GLOSSARY OF TERMS RELATING TO OILS AND FATS

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Indian Standard

GLOSSARY OF TERMS RELATING TO OILS AND FATS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 20 November 1985, after the draft finalized by the Oils and Oilseeds Sectional Committee had been approved by the Chemical Division Council and the Agricultural and Food Products Division Council.

0.2 Various terms relating to oils, fats and their industrial products are being frequently used in the trade and Government policy documents and standard specifications. In order to have a uniform terminology and to give authoritative definition to some of these terms, this standard has been prepared. Information has been freely drawn from various international specifications and technical literature, too numerous to be mentioned individually. This standard is expected to facilitate common understanding of the terms by all concerned.

0.3 A standard on the trade names of different oil bearing materials and their botanical nomenclature, as well as their analytical specifications will be issued separately in due course. Certain common terms are also included in IS : 9373-1979* and IS : 9328-1979†.

0.4 This standard is intended chiefly to cover the technical definitions of terms, and it may not necessarily include all the legal meanings of the terms.

1. SCOPE

1.1 This standard defines the various terms used, concerning oils and fats and their industrial products. Some of the analytical terms commonly used in the specifications have also been included.

2. DEFINITIONS

2.1 Acetone Tolerance — Acetone tolerance is a method employed as a measure of the high polymer content of heat bodied drying oils such as stand oil. Acetone tolerance of a drying oil is defined as the number of grams of acetone required to produce a persistent cloudiness in 100 g of oil at 25°C, under the conditions prescribed in the test.

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*Glossary of terms relating to bakery industry.

†Glossary of terms relating to confectionery industry.

2.2 Acetyl Value — The number of milligrams of potassium hydroxide required to neutralize the acetic acid liberated by the hydrolysis of one gram of the acetylated oil or fat. Acetyl value of an oil or fat is a measure of the hydroxyl content of the material.

2.3 Acid Oil — The product consisting essentially of a mixture of fatty acids obtained by the treatment of soapstock with a mineral acid solution.

2.4 Acid Value — The number of milligrams of potassium hydroxide required to neutralize the free acid present in one gram of the oil or fat under the prescribed conditions. The acidity of the oil or fat indicated by its acid value is frequently expressed as free fatty acids present in the sample.

2.5 Acidolysis — Acidolysis is the process of displacement of the fatty acid radical(s) of an ester by another fatty acid(s).

2.6 Acidulated Soap Stock — The product that results from the complete acidulation of soap stock. Minimum percentage of total fatty acids are usually specified.

2.7 Active Oxygen Method — A method used for measuring the stability of oils and fats by bubbling air through the hot oil and measuring the formation of peroxides. The method is also referred to as SWIFT STABILITY TEST or AERATION TEST.

2.8 Adsorption — The existence of a higher concentration of a component at the surface of a phase, than is present in the main bulk of the phase is known as adsorption. The process is commonly used in oil and fat industry for the removal of colour and the adsorbents used are bleaching earth and carbon in natural and/or in activated form.

2.9 Adatoxin — Polynuclear toxic substances derived from stain of the mould *Aspergillus flavous*, occurring in peanuts and many other plant food product such as maize, etc.

2.10 Alcoholysis — Alcoholysis is the process of displacement of the alcohol radical of an ester by another alcohol.

2.11 Alkali Refining — Alkali refining is a process in which free fatty acid level in oils and fats is reduced by reacting it with alkali, forming alkali metal soap which is then removed by setting or centrifuging and washing.

2.12 Alkyl Resin — A general term applied to synthetic resin formed from a polyhydric alcohol and a poly basic acid.

2.13 Amino Acids — Chief components of proteins building which are the building blocks of living tissues.

2.14 Aniline Point — Aniline point is the lowest temperature at which equal volumes of freshly distilled aniline and the substances being tested are completely miscible.

2.15 Antifoam Agents — Antifoaming agents are the substances which are added to the oils and fats to overcome or minimize foaming observed during processing or frying.

2.16 Antioxidants — These are synthetic or naturally occurring substances which inhibit the oxidation of fats and oils or fat containing food stuffs. They prevent oxidative rancidity and increase shelf life of the product.

2.17 Ash — Ash is the mineral matter found after ignition of oils or fats.

2.18 Auto-Oxidation — This is the name given to the process of self catalysed oxidation, occurring in the presence of air. Drying of vegetable oils, the spoilage of fats due to oxidative rancidity are a few examples. It is sometimes also called as auto-catalysis.

2.19 Auto-Ignition Point — Auto-ignition point is the minimum temperature required to initiate or cause self sustained combustion in any substance in the absence of spark of flame. Ignition temperature varies with the test method.

2.20 Bakery Shortening — Bakery shortening has been defined as vanaspati meant for use as a shortening or leavening agent in the manufacture of bakery products, that is, for promoting the developments of the desired cellular structure in the bakery product with accompanying increase in its tenderness and volume.

2.21 Baudouin's Test — It is a specific test for sesame oil. The development of a permanent pink colour with furfural solution in the presence of concentrated hydrochloric acid indicates the presence of sesame oil. Hydrogenated oils give less sensitive or even negative reaction.

2.22 Beilstein Test — It is a qualitative test for the detection of chlorine in organic compounds, particularly for testing chlorinated solvent in oils and fats.

2.23 Besson Test — The test based upon the reaction of silver nitrate directly with the oil dissolved in a solvent is used for differenciation of kapok oil as distinct from cottonseed oil and other vegetable oils. The test is done in a sample of oil, which has been refined with alkali and filtered with diatomaceous earth. Kapok seed oil closely resembles cottonseed oil as it also gives Halphen test. It can be distinguished from the latter by Besson Test.

2.24 Bellier Turbidity Temperature Test (Acetic Acid Method) — The test is specific for detection of peanut or groundnut oil and is based on the comparative insolubility of arachidic, behenic and lignoceric acid in 70 percent ethanol. It is based upon the critical solution temperature of oil in the prescribed solvent.

2.25 Bleaching — When applied to oils and fats the term is applied to special treatments given for reduction in colour of oil or fat. When done in conjunction with adsorbents, it is known as adsorption bleaching. Chemical bleaching is the term used exclusively for removal of coloured compound by chemical processing with specific agents such as oxidising and reducing agents like sodium hypochlorite and sodium hydrosulphite. Some of the colouring matters particularly carotenoids get decolourized by heat and when done in the presence of hydrogen, the process is sometimes called as hydro bleaching. Some removal of colour also takes place in the process of chemical refining and deacidification of fats by steam stripping.

2.26 Bleaching Earths — Bleaching earths are the montmorillionite clays which in their natural state or after physical or chemical activation, have the capacity to adsorb colouring matter from oils or fats. They are fine crystalline silicates of aluminium and/or magnesium with variable amounts of lime, alkalies, iron and with a proportion of water of hydration.

2.27 Blending — It is the process of mixing of two or more straight or modified oils and fats, to satisfy the prescribed technical specifications, for a particular product application.

2.28 Blown Oils — (Oxidized oil, base oil, thickened oil, polymerized oil)— Vegetable and animal oils, which have been treated and agitated by a current of air or oxygen with application of heat. They are partially oxidized, deodorized and polymerized by this treatment and have increased density, viscosity and drying power.

2.29 Boiled Oils — (Or Oxidized Oils) are obtained by heating the oils generally with the addition of small quantity of oxidising agents. These are used in paints and varnish industry. Pale boiled oil is paler in colour and contains added driers. Boiled oils blown to a higher specific gravity are designated as 'Double Boiled', 'Triple Boiled' or 'Heavy Boiled' oil.

2.30 Bomer Value — Bomer value is defined as the sum of the melting point of triglycerides isolated by the prescribed method and double the difference between this melting point and that of the corresponding fatty acids. The test is particularly useful for detecting the adulteration of foreign fats in pork fat (primarily lard).

2.31 Bone Oil or Fat — It is an oil or fat extracted from bones by means of boiling water, steam or organic solvents. Bone fat is used in soap and candle making whereas bone oil is used as a lubricant and for dressing the skins.

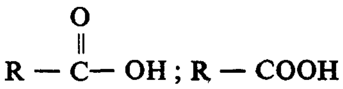
2.32 Break Material — Break material is the term generally used for flocculent material (precipitate) that appears in and can be separated from crude oil, when oil or fat has been rapidly heated to temperature between 250 to 300°C. It is found to be high in ash content, contains phosphorus, calcium and magnesium derived from phospholipids, which get decomposed at such high temperature.

2.33 Break Test — The method which is applicable to crude soybean oil and crude linseed oil determines the material in percentage of the oil, which is rendered insoluble in carbon tetrachloride by heating the specified quantity of oil to specific temperature, in presence of acid.

2.34 Butter — It is a fatty product made from milk or cream or both and consisting of emulsion of fat globules and water.

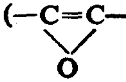
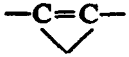
2.35 Butter Fat — The oily portion of the milk of mammal, is largely composed of glycerides of oleic, stearic and palmitic acid with smaller amounts of glycerides of butyric, caproic, caprylic and capric acids. Cow's milk contains approximately 4 percent butter fat. Table butter (creamery) has been defined as the product obtained from cow or buffalo milk or a combination thereof or from cream or curd obtained from cow or buffalo milk or a combination thereof with or without the addition of common salt and annatto or carotene as colouring matter. It shall contain not less than 80 percent by mass of milk fats.

2.36 Carboxylic Acids — Carboxylic acids are the most important organic acids found in oils and fats. They contain one or more carboxylic group (-COOH) in their molecules. The molecular structure and general formula for carboxylic acids is as follows:



$$R - \overset{\overset{\displaystyle O}{\|}}{C} - OH \; ; \; R - COOH \qquad R = \text{alkyl group}$$

They are classified according to the number of carboxyl groups present in the molecule, as mono-, di-, tri- and tetra-carboxylic acids containining one, two, three and four carboxylic groups in the molecule as in fatty acids, oxalic acid, citric acid and mellophonic acid, respectively. Some of the carboxylic acids are known to have an additional functional

group like hydroxy (-OH) in ricinoleic acid, epoxy  $(-\underset{\diagdown O \diagup}{C=C}-)$ in vernolic acid cyclopropene  $(-\underset{\diagdown\diagup}{C=C}-)$ in sterculic acid, etc.

Strength of a carboxylic acid depends on the number of available protons from the molecule. Accordingly mono-, di-, tri- and poly- basic acids release one, two, three, and more than three protons, respectively. Monobasic carboxylic acids, dibasic carboxylic acids and polybasic carboxylic acids have one, two, three or more than three available hydrogens, respectively.

Carboxylic acids may also be classified in terms of groups, other than the carboxyl and hydroxy groups, they may contain —ketonic carboxylic acids which contain ketonic ($>C=O$) group and are reported to be formed in some of the fat processing operations such as dehydroxylation of castor oil. Aldehydic carboxylic acids contain the —CHO group. Amino carboxylic acids contain the $-NH_2$ group, as found in glycine (amino acetic acid).

2.37 Cocoa Butter — Cocoa butter is a cocoa fat, which is hard at room temperature. It is the fat obtained from roasting sound Theobroma Cocoa beans removing the shell, breaking the ribs and pressing the fractured ribs to obtain oil.

2.38 Carotenoids — A group of naturally occurring, fat soluble pigments composed of isoprene units. The most important are carotene and xanthophyll, which occur with chlorophyll in some of the oils. β-carotene has gained importance since it has been shown to be the precursor of vitamin A, into which it is converted in the liver.

2.39 Catalysis — The term is used to describe all processes in which the rate of reaction is influenced, positively or negatively, by a substance called a 'catalyst' which itself remains chemically unchanged at the completion of the reaction.

2.40 Catalyst — It is a substance, added in very small quntities to the components of a chemical reaction to increase or decrease the rate of reaction but it cannot initiate reaction by itself.

2.41 Chelating Agents — Chelating agents are the additives used in oil and fat processing to inactive by complex formation, trace amounts of metals that would catalyse oxidation of the food products. Citric and phosphoric acids are commonly used chelating agents in oils and fats.

2.42 Chlorophyll — Chlorophyll is the green pigment essential for photosynthesis, found in vegetative parts of the plants.

2.43 Chloridized Oil — Chlorinated and iodised vegetable oil containing 26 to 28 percent iodine in organic combination used in medicine.

2.44 Cholesterol — The sterol most commonly found in animals, a monounsaturated, secondary alcohol of the cyclopentenophenanthrene (4 ring, fused) system. It occurs in animals in part as free sterol, and in part esterified with higher fatty acids. Its presence is frequently used as a test for the detection of animal fats in vegetable oils and fats.

2.45 Chromatography — Chromatography is the name given to a procedure based on physical adsorption principles for separating various components from a mixture of chemical substances. In its broad interpretation, chromatography is a combination of separation, identification and quantitative measurement. Chromatography depends upon selective retardation and separation of substances by a bed of porous sorptive media as they are transported through the bed by a moving fluid. The degree of retardation and hence the rate of migration of each substance is determined by its relative affinity of the sorbent. The sorbent bed is often referred to as the stationary phase, the moving fluid as the mobile phase. The mobile phase may be liquid or gas. In the case of gas as mobile phase it is known as gas chromatography. The term solvent is used in both gas chromatography, in reference to the stationary liquid phase, and liquid chromatography in reference to the mobile liquid phase. Chromatography is sometimes classified in relation to some distinctive feature of the apparatus or method used. The terms commonly used refer to a specific technique such as thin layer, paper and gel permeation chromatography.

2.46 Cloud Point — It is the temperature at which, under the conditions of the test, a cloud is induced in the sample caused by the first stage of crystallisation.

2.47 Coagulation — Coagulation is the name given to the treatment given to the oil or fat for removal of coarse suspension and colloidally suspended matter by heating alone or in presence of reagents, which help precipitation of the impurities, which can be subesquently removed by decantation, filtration, and other separation processes.

2.48 Cod Liver Oil — Cod liver oil is a marine oil obtained from freshly extracted sound livers of cod fish by hot water extraction.

2.49 Cod Oil — The term is commonly used for inferior grades of cod liver oils, not suitable for medicinal purposes.

2.50 Codex Alimentarius Commission — A commission operating under Food and Agriculture Organisation/World Health Organisation (FAO/ WHO) auspices which has the task of preparing model standards and codes of practice for edible products and food processes.

2.51 Cold Test — The test measures the resistance of the sample to crystallisation and is commonly used as an index of winterising or similar stearin removing process.

2.52 Congeal Point — Congeal point is a measure of the solidification temperature of fat under the conditions prescribedby the method. The distinction between this and the titre is that the latter is the solidification temperature of fatty acids while the congeal point is applied directly to fats without separation of fatty acids.

2.53 Confectionery Fats — Confectionery fats are specialised products, possessing specific melting and organoleptic quality.

2.54 Conjugation — Two or more double bonds when separated by a single bond ($-C=C-C=C-$) are known as conjugated double bonds and the arrangement is known as conjugation. Eleostearic acid in tung oil is an example.

2.55 Consistency — It is a rheological property describing the plastic state, varying from very soft like petroleum jelly, through soft, medium, firm, tough to hard and brittle. Consistency can be determined by measuring solid fat content at a given temperature or by instruments capable of measuring rheological properties of substances, such as penterometers, viscometers, etc.

2.56 Cooking — Cooking is the name given to the heat treatment applied to oilseeds and similar material prior to pressing for rupturing the cells.

2.57 Creaming — Creaming is the term applied to the fat to indicate its ability to absorb air during mixing. Certain ingredients, such as sugar, facilitate the creaming process, when used in bakeries.

2.58 Crismer Test — This test determines the miscibility of the oil or fat sample with a standard reagent specified in the test. The values obtained are characteristics within certain limits for each type of oil.

2.59 Critical Solution Temperature — Critical solution temperature is the temperature at which fatty oil becomes completely soluble in certain organic solvents and affords some indication of the character of the oils.

2.60 Crude Natural Vegetable Oil — It is the oil which is extracted from the seeds or fruits or other oil bearing material from vegetable sources, through mechanical procedures or through the use of solvents and separated from the vegetable remnants of the raw material employed in the extraction, contains only the elements proper of the oil and which correspond to the composition of the seed, fruit or other oil bearing material subjected to the process of oil recovery.

2.61 Crystal Transformation — Crystal transformation is the change in a packaged shortening, which results in formation of a grainy soft product, which may lose incorporated gas. It is caused by improper hydrogenation, poor formulation, unstable hard fat used for texturising or wrong chilling condition.

2.62 Cutting Oil — Cutting oil is a liquid mixture containing oil, applied to a cutting tool to assist in the machining operation by washing away the chips or serving as a lubricant or coolant. It may be based on vegetable oil or mineral oil.

2.63 Deacidification — Deacidification is the general term for all the processes carried on to the oil or fat for removal of free fatty acids from them.

2.64 Decortication — It is the process of removal of hulls or shells from seeds by mechanical means.

2.65 Degummed Oil — It is the product resulting from washing crude vegetable oil with water and/or steam for a specified period of time with or without the addition of degumming agents and then centrifuging oil/water mixture to remove the phosphatides, etc.

2.66 Degumming — Degumming is the name given to a treatment given to the oil or fat for removal of gums.

2.67 Dehulling — Dehulling is the process of separation of hulls from meal.

2.68 Dehydrated Castor Oil — Commonly abbreviated as DCO, is castor oil which undergoes dehydration on heating with or without catalysts to produce an oil which has drying property.

2.69 Delinting — Delinting is the process of removing adhering fibres from ginned cottonseed. The equipment used for this purpose are known as delinters sometime abbreviated as only linters.

2.70 Density — Density of a substance is the ratio of its mass to its volume. For oils and fats, it is expressed in grams per millilitre, at specified temperature.

2.71 Deodorisation — Deodorisation also sometime known as vacuum steam distillation, is the process designed to remove all oxidative cleavage products that impart an odour or flavour to the oil. It may also remove free fatty acids, tocopherols, sterols and other minor components, both useful and of undesirable nature. Deodorisation occurs, simultaneously with deacidification when it is done by steam distillation by the process of physical refining.

2.72 Deoiled Meal — It is the name given to residual material left over, when oil is extracted by a solvent from any oil bearing material.

2.73 Diene Value — Diene value is an index of conjugated unsaturated linkages expressed in terms of the equivalent number of centigrams of iodine per gram of the sample.

2.74 Diglycerides (Diacyl Glycerols) — These are the esters of glycerol having two hydroxyl groups of glycerol combined with two fatty acids and one hydroxyl group remaining unesterified.

2.75 Dilation — The dilation of a fat is the isothermal expansion, due to change of stage from solid to liquid, of the fat, which has previously been solidified under precisely prescribed conditions. It affords an empirical indication of the amount of crystalline matter in the fat, at that temperature.

2.76 Distillation — A method of separating volatile and non-volatile components of mixture by vaporisation and condensation.

2.77 Drier — A substance used to accelerate the drying of paints, varnishes, etc, by catalysing the oxidation of drying oils or synthetic resin varnishes is known as drier. The usual driers are salts of metals with a valence of two or more and unsaturated organic acid. Paste driers are commonly the metal salts dispersed in a drying oil.

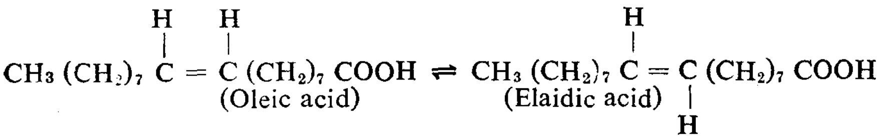
2.78 Drop Point — Drop point of a fat is the temperature at which the first drop falls from the cup under the specified conditions of the test.

2.79 Drying Oils — Are those which, when applied as a thin film, readily absorb oxygen from the air and polymerise to form a relatively tough, elastic film. Examples are natural vegetable oils such as linseed, tung, soyabean oils and dehydrated castor oil. The drying oils have high iodine value.

2.80 Drying Time — Drying time is the time required under the conditions of the test, for the oil film to dry up as the end point described in the test.

2.81 Edible Flour — Edible flour is the name given to ground material prepared from deoiled meal, which is derived from oil cake obtained either by single processing of good quality edible oil seeds or as a result of direct extraction oil from such oil seeds.

2.82 Elaidic Acid — Is the trans-isomer of oleic acid (Cis- -Cis monoenoic fatty acid).



$$CH_3(CH_2)_7\overset{H}{\overset{|}{C}}=\overset{H}{\overset{|}{C}}(CH_2)_7COOH \rightleftharpoons CH_3(CH_2)_7\overset{H}{\overset{|}{C}}=\underset{H}{\underset{|}{C}}(CH_2)_7COOH$$

(Oleic acid) (Elaidic acid)

2.82.1 *Estolide* — Is the term generally used for internal anhydrides formed during the heating or chemical treatment of hydroxy fatty acids such as ricinoleic acid present in castor oil.

2.83 Elaidinization — Indicates the conversion of any unsaturated fatty acid or related compound from the geometric *cis*-isomer to the corresponding trans form.

2.84 Elastomers — Materials that can be stretched repeatedly to 150 percent or more of their initial length and thereafter return rapidly and with force to approximately their original length.

2.85 Eleostearic Acid — Contains 3 conjugated double bonds and has the molecular formula $CH_3(CH_2)_3(CH=CH)_3(CH_2)_7$-COOH. Its glycerides are commercially present in tung oil and it is known to exist in two isomeric forms.

2.86 Emulsifying Agent — A material which increases the stability of a dispersion of one liquid in another. "Emulsifying Agents" or "Stabilising Agents" have been defined as substances which when added to food are capable of facilitating a uniform dispersion of oils and fats, in aqueous media or vice versa and for stabilising such emulsions.

2.87 Epoxidised Oils — Are oils obtained by treating oils with peracetic acid preformed or formed *in situ* by reaction between hydrogen peroxide and acetic acid in the presence of a catalyst. They are used as plasticisers and stabilisers, for example, vinyl for resins.

2.88 Essential Fatty Acid — Essential fatty acids fulfil vital physiological functions in the body but cannot be synthesised from simple precursors. They are therefore required in the diet. Linoleic acid and linolenic acid are synthesised only in plants and are the true naturally occurring essential fatty acids. According to latest view, linoleic acid may be kept under naturally occurring essential fatty acids because:

a) it is not synthesised in the body;

b) it is a precursor for synthesis of substances like prostaglandins; and

c) it also gives rise to the formation of linoleic acid (other acids considered essential till recently).

Arachidonic acid occurring in animal oils and fats is also an important essential fatty acid.

2.89 Essential Oil — Is an odoriferous volatile oil derived from the leaves, flowers or twigs of the plants and with herbs and spices, etc. Essential oils find application in perfume and flavours and chemically they are different from fixed oils.

2.90 Ester Value — Ester value is the number of milligrams of potassium hydroxide required to saponify the esters contained in 1 gram of the fat.

2.91 Esterification — Esterification is the condensation of an alcohol and acid to form an ester with the release of a molecule of water.

2.92 Expression — Expression is the process of removal of liquid from a solid by mechanical pressing. The devices commonly used for expressing oil are commonly known as 'Expellors' and the oil so recovered is known as expellor oil.

2.93 Fats — Fats are the esters of glycerol with higher fatty acids. There is no chemical difference between a fat and oil, the only distinction being that fats are solid at room temperature and oils are liquid.

2.94 Fat Liquoring Agent — Fat liquoring agent is the term commonly used for oil in water emulsion usually made from raw oils, made soluble by dispersing agent such as sulphonated oils.

2.95 Fat Bloom — Is the name given to change in crystal structure, that causes bloom in chocolate coatings, a defect which gives a white haze or even open grain on an original smooth glossy surface.

2.96 Fatty Acids — The carboxylic acids derived from or contained in a vegetable or animal fat or oil. All fatty acids are composed of a chain of alkyl groups containing from 4 to 22 and even sometimes higher carbon atoms (usually even numbered) and characterized by a terminal carboxylic radical —COOH. Fatty acids may be saturated or unsaturated and either solid, semi-solid or liquid. They are classed among the lipids alongwith waxes, sterols, etc. Saturated acids do not have any double bond, most important of them being butyric (C_4), lauric (C_{12}), palmitic (C_{16}) and stearic (C_{18}). Most common unsaturated fatty acids are oleic ($C_{18:1}$), linoleic ($C_{18:2}$) and linolenic ($C_{18:3}$) with one, two and three double bonds respectively (that is mono-, di- and tri-enolic acids). In addition to the common fatty acids, some natural fatty acids have different structures such as triple bonds, hydroxyl or ketone groups or epoxy and cyclopropane rings. Linoleic, linolenic and arachidonic acids are called as essential fatty acids because they are necessary nutrients that are not synthesised in the human body.

2.97 Fatty Acid Pitch — A by-product residue obtained from:

a) Soapstock and candle stock manufacture;

b) Refining of vegetable oils;
c) Refining of refuse greases;
d) Refining of wool greases; and
e) Fatty acid distillation.

It consists of polymerised fats and fatty acids, neutral oil, unsaponifiable matter, etc.

2.98 Fatty Alcohols — These long chain unbranched primary aliphatic alcohols, RCH_2OH, having higher molecular mass. Examples are cetyl alcohol, lauryl alcohol, oleyl strearyl alcohol, etc.

2.99 Fatty Amine — A normal aliphatic amine derived from fats and oils. May be saturated or unsaturated, primary, secondary or tertiary, but the alkyl groups are straight chain and have an even number of carbons in each. The length varies from C_8 to C_{22} carbon atoms.

2.100 Fatty Esters — These are compounds generated during the process of esterification by the combination of fatty acids and alcohol in the presence of a catalyst like boron trifloride (BF_3) sodium methoxide (MeONa), sulphuric acid (H_2SO_4), etc.

2.101 Fatty Matter — The term is used by analytical chemists to describe the fatty component of a complex food such as milk, cake or seed.

2.102 Fatty Nitrile — An organic cyanide derived from fatty acids.

2.103 F.A.C. Colour — The colour standards standardized on the basis of colour comparison against standards of definite colour composition.

2.104 Filtration — Filtration is the process of separating suspended solids from a liquid by forcing the mixture through a porous barrier.

2.105 Fire Point — Fire point is the temperature at which a substance, when ignited begins to burn freely after withdrawal of ignition agent.

2.106 Fish Oil — Fixed oils extracted from the entire body of the fish by cooking and compressing The solid product obtained by pressing or decantation of fish oils are known as fish stearin.

2.107 Fixed Oils — The term is used for oils and fats, which cannot easily be distilled without decomposition, which are not volatile and which cannot be carried off by superheated steam. Vegetable oils, animal fats and marine oils processed individually or in blends to remove certain objectionable constituents are known as processed fixed oils.

2.108 Flash Point — Flash point is the temperature at which the liquid gives a vapour sufficient to form an ignitable mixture, with the air near the surface of the liquid or within the test vessel. In oils and fats, it is particularly important to check the presence of extraction solvent like hexane in extracted oil or deoiled meal.

2.109 Flavour Reversion — Is the phenomenon of development of flavour and odour in a product, after its initial deodorisation to complete blendness. It is strictly an organoleptic observation and is caused by changes in substances, which have been oxidised prior to, but not removed by deodorisation.

2.110 Flow Point — Flow point of a fat is the temperature, at which it forms an approximately hemi-spherical protuberance at the orifice of the cup under the specified conditions of the test.

2.111 Foots — The term is generally used for non oily matter, that will settle out on storage.

2.112 Fractionation — Fractionation is the process applied to oils and fats to separate into two or more fractions with different melting points.

2.113 French Dressing — French dressing is the separable liquid or emulsified viscous food prepared from vegetable oils. It contains not less than 30 percent by mass of vegetable oil. A good french dressing may contain 55 to 65 percent of oil.

2.114 Fuller's Earth — A natural porous absorptive and colloidal aluminium silicate; containing some magnesia and a little iron. It is clay like in character and used as such or after activation for bleaching of oils or fats.

2.115 Gardener Break Test — The test determines the material which under the specified conditions separates from the oil and is rendered insoluble in carbon tetrachloride.

2.116 Gardener Colour Standards — Are used to evaluate the colour of drying oils, the comparison being made in the manner prescribed. The standard colours are prepared from solutions of inorganic compounds.

2.117 Gel Time — Of a drying oil is the time required for the oil to form a solid gel under specified conditions of temperature.

2.118 Ghee — Is the name given in India to clarified butter made from milk, from which moisture, casein and other constituents have been removed by melting, decanting and heating.

2.119 Glycosides — A class of organic compounds which can be hydrolysed by action of enzymes, acids or alkalies into a sugar and other substances known as aglycones.

2.120 Gossypol — Is the name given to a natural polyphenol ($C_{30}H_{30}O_8$) occurring in cottonseed oil.

2.121 Granularity — It is the agglomeration of crystals resulting in the formation of granules generally visible to naked eye. Vanaspati and ghee are common products where granular structure is considered as a quality parameter.

2.122 Gums — A variety of substances of ill defined chemical compositions obtained from vegetable sources.

2.123 Halphen's Test — This test detects the presence of cottonseed oil and other oils and fats containing fatty acids of cyclopropenoid structure in vegetable or animal fats and oils. A concession may be left for a slight positive reaction which, sometimesis, shown by cow's or buffalow's milk fat, fed on cotton seed and sesame oil cakes.

2.124 Heat Stability Test — Heat stability test measures the darkening in colour of fatty acids on the Gardener scale, when they are heated under specified conditions in presence of nitrogen. This is particularly important in case of fatty acids used by alkyl producers.

2.125 Holde's Test — Is the name given to the test for detection of presence of mineral oil in oils and fats. The test is based upon the development of haziness or turbidity by mineral oil, under the conditions described in the test. The test findings need confirmation by thin layer chromatography.

2.126 Hydraulic Pressing — Hydraulic pressing is the process of recovering oil from certain oil bearing material by intermittent pressing in a hydraulic press after suitable pre-treatment.

2.127 Hydrogen Iodine Value — Hydrogen iodine value is defined as the iodine equivalent of the hydrogen absorbed per gram of fat. This is generally abbreviated to the term hydrogen value.

2.128 Hydrogenation — Hydrogenation is a process in which hydrogen atoms are added at the double bonds of unsaturated fatty acids under conditions of high temperature and pressure in the presence of a suitable catalyst, usually nickel. During the course of this process, the double bonds of the fatty acids in the triglyceride become saturated, which results in a physically harder product more resistant to oxidation, with resultant increase in melting point. The process is sometime referred to as 'Hardening'.

2.129 Hydrolysis — Hydrolysis is the process of splitting of an ester by water when free alcohol and acids are formed.

2.130 Hydrolytic Rancidity — Hydrolytic rancidity is the process which results from the liberation of fatty acids from glyceride molecule, in the presence of moisture and heat. Coconut oil is the typical example which develops soapy flavour after hydrolytic rancidity.

2.131 Hydroxyl Value — The number of milligrams of potassium hydroxide required to neutralize the acetic acid capable of combining by acetylation with one gram of the oil or fat. Hydroxyl value is equivalent to the hydroxyl content of the material based on the weight of the unacetylated fat.

2.132 Industrial Vegetable Oil — It is the vegetable oil which in the material state or when subjected to suitable procedures possesses properties, which make it apt for particular uses, excluding food purposes.

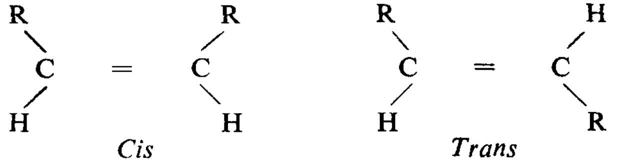
2.133 Insoluble Impurities — Dirt, meal and other foreign substances which are insoluble in kerosine and petroleum ether under the conditions of the prescribed test.

2.134 Interesterification — Interesterification refers to an exchange of acid or alcohol groups by esters. This is sometime also called ester interchange or trans esterification.

2.135 Iodine Value — The iodine value of the oil or fat gives an indication of the degree of unsaturation of the constituent fatty glycerides. Wij's method is applicable to all normal oils and fats not containing conjugated systems. Iodine value (Wij's) is the number of grams of iodine, absorbed per 100 grams of the oil or fat, when determined by using Wij's solution.

2.136 Isomerisation — Is defined as the rearrangement of the structural configuration of a molecule without changing its molecular mass. In the case of oils and fats, during the hydrogenation of fats, both positional and geometric isomers are formed in addition to the saturation of the double bond and isomerisation is very important in relation to the consistency of partially hydrogenated fats. Isomers of oleic acid are sometime termed as *iso*-oleic acids and are characterised by an increase in melting point of the original acid.

2.137 Isomerism — Isomerism is the phenomenon in which compounds having same molecular formula exhibit different physical and chemical properties. Such compounds are known as isomers. Positional isomerism results from the difference in the position occupied by the same functional group in the molecule. Geometrical isomerism or *cis-trans* isomerism occurs in unsaturated molecules, which contain two unsymmetrically substituted groups to the double bond. A molecule in which the ethylenic groups are known to be on the same side of the plane joining the unsaturated carbons is termed as *cis*- and otherwise in *trans*-form


Cis *Trans*

2.138 IUPAC — International Union of Pure and Applied Chemistry — the standard methods of oils and fats section.

2.139 Kreis Test – A qualitative test for detection of incipient rancidity, based on the reaction between phloroglucinol and some constituents formed in the fat, probably epihydrin aldehyde

2.140 Krischner Value — Krischner value is the number of millilitres of 0·1 N aqueous alkali solution required to neutralise the water-soluble volatile acids which form water soluble silver salt, isolated from 5 grams of the oil or fat under prescribed conditions.

2.141 Lanolin – Lanolin is a purified, unctuous, fat like substance obtained from the wool of sheep.

2.142 Lard — Lard means the rendered fat from hogs and shall not contain more than 1 percent of substance other than fatty acids and fats. It is offered commercially in different grades. Neutral lard is the highest quality and obtained by rendering at temperature below 50°C. Leaf lard is another grade produced by water rendering in autoclaves at 100°C. Choice lard, prime steam lard are some of the inferior grades produced, liquid lard oil and lard stearin are prepared by chilling and pressing of lard.

2.143 Lard Oil — Is a product obtained by the cold pressing of lard or of other rendered pig fat.

2.144 Lard Stearin — Is the solid white fat left after lard or other rendered pig fat has been pressed.

2.145 Lea Value — This is sometime used for measurement of rancidity due to peroxides. It is expressed in millimoles peroxide, oxygen per kg fat. Numerically peroxide value is twice as great as the lea value.

2.146 Liebermann Storch Reaction — This test based upon addition of acetic anhydride and sulphuric acid is used for detection of rosin, when it temporarily produces a red-violet colour. The test is not reliable in presence of some sterols, wool fat and fatty acids from sulphur oils.

2.147 Limed Oil — Limed oil or calci coaters represent a special modification of heat bodied oils used in paint industry.

2.148 a) Linoleic Acid ($C_{18}H_{32}O_2$) — It is an octadeca-dienoic (having two double bonds) fatty acid. It is the most usual form of dethenoid C_{18} acids found in oils and fats. It occurs in 'semi-drying' or 'drying' classes of seed oils and is a major component of the mixed fatty acids obtained from seed fats of safflower, sunflower, soybean, etc. This has been regarded as an essential fatty acid.

b) **Linolenic Acid** ($C_{18}H_{30}O_2$) — It is an octadeca-trienoic (having three double bonds) fatty acid. It is the most usual form of triethenoid C_{18} acid found in oils and fats. It occurs in varying but appreciable proportions in 'drying' class of seed oils like linseed, rubber seed, perilla seed, etc.

2.149 Linoxyn — A semi solid rubbery product, which is a highly oxidised linseed oil used in the manufacture of linoleum.

2.150 Lipase — These are the enzymes which hydrolyse the esters of glycerol.

2.151 Lipid — An inclusive term for fats and fat derived materials. It includes all substances which, are:

a) Relatively insoluble in water but soluble in organic solvents like benzene, chloroform, acetone, ether, etc;

b) Related either actually or potentially to fatty acid esters, fatty alcohols, sterols, waxes, etc; and

c) Utilisable by the animal organism.

They are one of the chief structural components of living cells.

2.152 Lipolysis — Lipolysis is the process of hydrolysis of the glycerides in germinating seeds or other oil bearing material to form free fatty acids due to the action of lipase.

2.153 M.I.U. — It is the combined content of non-fatty material present in a fat, namely moisture (M), insoluble impurities (I) and unsaponifiable matter (U).

2.154 Mackey's Test — Mackey's test is based on the temperature rise due to oxidation of the acid when absorbed in cotton in a wire mesh cylinder through which air is circulated. The test indicates the relative oxidative stability of certain fatty acids such as oleic acid and is sometimes used to ascertain the suitability of fatty oils to be applied to textiles.

2.155 Maleic Oils — Are obtained by treating, for example, soybean oil with limited amount of maleic anhydride at a temperature of 200°C or more in conjunction with sufficient polyhydric alcohol to esterify the extra acid groups. Maleic oils so obtained have good drying properties.

2.156 Margarine — Is the name used for the product, which is an emulsion of edible oils and fats with water, which resembles table (creamary) butter in consistency and appearance. The product is generally required to conform to the standards of quality laid down by the enforcing authority. Number of varieties are now being offered to the consumer, with special characteristics. Table margarine is a butter substitute with a consistency suitable for spreading within the widest possible temperature range. Whipped margarine is the normal type, but which has been softened by incorporating nitrogen. Puff pastry margarine is a special type specifically made for production of puff and pastry. The structure of this type is composed of thin laminates.

2.157 Matter Insoluble in Chloroform — Represents mineral contamination, since all the materials naturally occurring in oils are soluble under the conditions described in the test.

2.158 Mayonnaise, Mayonnaise Dressing — Consist of mixture of vegetable oils with egg, vinegar and other permitted ingredients. The minimum percentage of vegetable oils is specified to be 65 percent in some of the international specifications for such products. A variety is popularly known as salad dressing which contains 35 percent as minimum percentage of vegetable oil, specified in some of the International standards. They are different from salad oils.

2.159 Meal — The product resulting from the oil bearing seeds or other material after the removal of part of oil by pressure or solvent extraction. Where the residual oil in the meal is less that is about 1 percent it is termed as defatted meal.

2.160 Mechanical Pressing — Mechanical pressing is a continuous pressing process, at elevated temperature using expellers or screw presses, which utilises a warm shaft continuously rotating within a pressing cylinder or cage to express the oil from oil bearing seed or other material after suitable processing or pretreatment.

2.161 Melting Point — Melting point of a pure substance, which consists of a single constituent only, is the temperature at which its liquid and solid phases are in equilibrium under a pressure of one atmosphere. Natural oils or fats do not consist of single constituents, instead they are complex mixtures containing several components and they exhibit a melting behaviour different from that of pure compounds. The term melting point does not imply the same characteristics that it does with pure crystalline substances. Fats pass through a stage of gradual softening before they become completely liquid. The melting point is therefore defined by the specific conditions and the method by which it is determined. A variety of techniques are employed to measure the melting points of fats and a variety of methods such as melting point closed capillary tube method, melting point open capillary tube method, melting point Wiley's method, melting point obbelobide method (sometime designated as flow and drop point), melting point photo electric method, slip point, cogeal point, setting point, etc, are used to determine such related values. In case of capillary slip method, it is the temperature at which the oil or fat softens or becomes sufficiently fluid to slip or run whereas in case of closed-tube complete-fusion method, it is the temperature at which the oil or fat becomes perfectly clear and liquid.

2.162 **Moisture and Volatile Content** — Moisture and volatile content is the loss in mass, which the product to be analysed undergoes on heating at 105°C, under the operating conditions of the test.

2.163 **Molecular Rearrangement** — Molecular rearrangement is a process used to alter the physical characteristics of an oil by redistributing the fatty acids on the glycerol molecule.

2.164 **Monoglycerides** — These are the esters of glycerols combined with one fatty acid with two hydroxyl groups of the glycerol remaining free. These are used as emulsifiers in margarine and ice-cream, etc, to help the uniform dispersion of oil and water.

2.165 **Morphology** — The term is generally used to denote the general relation of the physical behaviour and performance of fats, oils and shortenings to their crystal structure and molecular configuration of their triglyceride components.

2.166 **Muciliage** — Muciliage in oils and fats, is often an evasive material, not shown up in the impurities test, but which can still have a bearing on the subsequent processing and properties.

2.167 **Mutton Fat** — Mutton fat means fat obtained from carcass of sheep or goat.

2.168 **Neat's Foot Oil** — Is the term commercially used for oils from the feet of the ox and other various animals.

2.169 **Neutral Vegetable Oil** — It is the vegetable oil which in the natural state or when subjected to suitable procedures have a minimum acid value of 0·5 or its equivalent expressed in percentage of oleic acid, that is to say 0·25 percent.

2.170 **Neutralisation** — Neutralisation is the process of removal of free fatty acids from fats and oils, by neutralisation with bases, such as caustic soda, soda ash and other reagents. The process when applied to crude oils is generally termed as pre-neutralisation and when adopted after hardening, is called as post-neutralisation. The neutralisation process, when done in the presence of extraction solvents, such as hexane is termed as miscella refining A combination of polar and non-polar solvents such as hexane and alcohol is sometime present, at the time of addition of bases and the process is termed as double solvent refining.

2.171 Oil Cake — The residue obtained after the expression of vegetable oils from oil bearing seeds.

2.172 Oil Cloth — Is a special coated cloth which consists of a woven canvas (jute) backing coated on both sides with several layers of oil paint.

2.173 Oil Foots and Dregs — Oily or muciligenous residues resulting from purification of oils. They are used in the manufacture of soaps and lubricants.

2.174 Oleic Acid — Oleic acid is pale yellow, oily liquid present in all vegetable and animal oils and fats in glyceride form. Chemically oleic acid contains 18 carbon atoms with a double bond at 9th position in *cis*-form. Commercial oleic acid is a mixture consisting chiefly of oleic acid and other fatty acids.

2.175 Oleine — Commercially the term is generally used for liquid fatty acid, obtained during the cold pressing of stearic acid. In technical sense, it is used for triolein, a triglyceride of oleic acid occurring in most fats and oils.

2.176 Oleo Oil — (Edible) is a white, or yellowish solid fat of soft consistency with a faint smell of tallow and an agreeable flavour and consists mainly of the glycerides of oleic acid (tri-olein). It is obtained by pressing of tallow.

2.177 Oleo Stearin — *See* 'Tallow Stearin' under **2.250**.

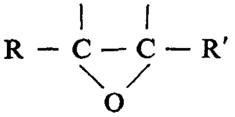
2.178 Organoleptic Test — This test refers to a careful testing procedure by experienced personnel. It is an important test to be carried on all further refined oils, both in regard to odour and taste.

2.179 Oven Test — Oven test is an accelerated rancidity development test conducted on an oil or fat in a constant temperature oven under the conditions prescribed in the test. A common test generally used is Schasl oven test.

2.180 Oxidised Acid — Oxidised acids are the acids which are insoluble in hexane and soluble in ethanol under the specified conditions of the test.

2.181 Oxidised Oil — It is the oil deteriorated in quality due to attack by atmospheric oxygen.

2.182 Oxirane Oxygen — Oxirane oxygen is the oxygen contained in the following grouping:



This is titrated directly with hydrogen bromide in acetic acid as per conditions prescribed in the test. It is applicable to epoxidised fatty material and epoxy compounds in general.

2.183 Oxy Polymers — These are the ill-defined polymerisation products of oxidation, formed particularly at high temperature during frying.

2.184 Palm Distillate — It is the distillate obtained during physical refining of palm oil and includes a mixture of fatty acids and entrained glycerides alongwith odoriferous compounds.

2.185 Palm Stearin — It is the solid fraction obtained from fractionation of palm oil by a process of dry, detergent or solvent fractionation.

2.186 Palmitic Acid — It is a white crystalline solid. It has a molecular formula $C_{16}H_{32}O_2$ with a molecular mass of 256. Technical grade palmitic acid consists chiefly of palmitic (hexadecanoic) acid and very small amount of stearic (octa decanoic) acid.

2.187 Palmolein — It is the liquid fraction obtained by fractionation of palm oil.

2.188 Para-Anisidine Value — Para anisidine value is defined by conversion as 100 times optical density measured in 1 cm cell of a solution containing 1 gram of the oil in 100 ml of a mixture of solvent and the para ansidine reagent under the conditions of the test.

2.189 P/S Ratio — Is the ratio of poly unsaturated (P) to saturated (S) fatty acids and has been used to express the potential of dietary fats to reduce elevated serum cholesterol levels.

2.190 Penetration Value — Penetration value is measured by allowing a metal cone of known mass and angle to penetrate the sample of fat for specified time. The yield value (C-Value) is calculated from the penetration depth and is proportional to that obtained by thumb test.

2.191 Peroxide Value — Peroxide value is the quantity of those substances in the sample of oil or fat, expressed in terms of milliequivalent of active oxygen per kilogram, which oxidise potassium iodide under the prescribed conditions in the test, normally it is a measure of peroxides formed due to oxidation of the oil or fat.

2.192 Petrolatum — Petrolatum is a purified semisolid mixture of hydrocarbons obtained from petroleum.

2.193 Phosphatide (Phospholipid) — A group of lipid compounds that yield on hydrolysis, phosphoric acid, an alcohol, fatty acid and a nitrogenous base. They include lecithin, cephaline, choline found in oils and fats.

2.194 Phosphoric Acid — It is the name given to ortho-phosphoric acid having the formula H_3PO_4. These are commonly used in oil and fat processing as degumming agents and to reduce metal contamination such as that of copper and iron.

2.195 Physical Refining — In simple terms, physical refining may be defined as free fatty acids removal by the action of high temperature, high vacuum and with live steam applied directly to the oil. Physical refining also frequently referred to as steam refining, may more accurately be described as distillative deacidification.

2.196 Plastic Range — Plastic range is the expression frequently used in the shortening industry. The term signifies the extent of temperature range over which a given fatty product remains workable, as opposed to becoming excessively hard or soft. This is determined by measuring consistency of three or four samples, each previously equiliberated at a different temperature so as to cover the entire range of workability.

2.197 Plasticity — Plasticity is the property that permits permanent alteration of shape and/or size by slight stress and without rupture.

2.198 Polenske Value — The number of millilitres of 0·1 N aqueous sodium hydroxide solution required to neutralize the steam volatile water insoluble fatty acids distilled from 5 g of an oil or fat under the precise conditions specified in the method. The Polenske value is the measure of the steam volatile and water insoluble fatty acids, chiefly caprylic, capric and lauric acids, present in the oil or fat.

2.199 Polybromide Test — Polybromide test is a qualitative test for the presence of fatty acids with more than two non conjugated double bonds.

2.200 Polymorphism — Polymorphism is the ability of the fat to exist in number of different crystalline forms, depending on how the molecule arrange themselves in the solid state.

2.201 Pour Point — Pour point is the temperature just above which no movement can be observed as the sample is cooled to its solidification point.

2.202 Premier Jus (Oleo Stock) — Is the name given to the best edible quality of tallow. Inferior grades are known as beef tallow.

2.203 Preservatives — These are the substances which when added to food, are capable of inhibiting, retarding or arresting the process of fermentation, acidification or other decomposition of food.

2.204 Prime Bleachable Summer Yellow — It is a term applied to once refined cottonseed oil of bleachable quality which after bleaching will contain 0·025 percent or less free fatty acids, a very small quantity of colour bodies and water and volatile matter not exceeding 0·1 percent.

2.205 Prostaglandins — These are the physiologically active compounds with harmones like properties that are made by the animal body from certain polyunsaturated fatty acids like linoleic acid ingested in the diet.

2.206 Protein — A naturally occurring complex high polymer of amino acids containing carbon, hydrogen, oxygen, nitrogen and usually sulphur. It is one of the essential constituents of all living things and of the diet of animals and human beings.

2.207 Rancidity — Rancidity is the phenomenon of spoilage of fats, resulting in deterioration in quality and flavour. Oxidative rancidity is caused by combination of fat with oxygen. Hydrolytic rancidity is caused by breakdown of the fat triglyceride as a result of hydrolysis.

2.208 Ratio Number — Ratio number is the ratio of acid value to ester value and is indicated in the case of vegetable waxes.

2.209 Refining — The term is generally used for the treatments given to the oils or fats to remove their colour, free fatty acids, odour and other impurities.

2.210 Refining Efficiency — Is generally considered to be the yield of dry neutral refined oil as a percentage of the available neutral triglyceride content of the crude oil.

2.211 Refining Factor— It is the ratio of percent loss to percent free fatty acid (FFA), corrected for moisture and impurities.

2.212 Refining Loss — The percent loss from the original quantity of crude oil resulting from various refining processes. The loss varies depending on free fatty acid of the oil and other impurities removed during refining.

2.213 Refined Oil Edible — The term is commonly used for oils subjected to special refining processes to adopt it specially for use in food products. The processing may include degumming, bleaching, chemical, physical refining and deodorisation. The oils may also be subjected to other treatments such as winterisation, dewaxing, depending upon the end use. Technical grade refined oils are specially refined and further processed to meet the requirements and/or specifications for a definite industrial use. Refined vegetable oil has been defined as any edible vegetable oil, which is obtained by expression, neutralised with alkali, bleached with absorbent earth and/or activated carbon and deodorised with steam.

2.214 Refractive Index — The refractive index of a medium is the ratio of speed of the light of a definite wave length in vacuum to its speed in the medium. The selected wave length is the mean wave length of the D line of sodium (589·6 nm). In this case the notation is at t°C. In general, refractive index is given at 20°C for fats which are liquid at this temperature and 40 or 60°C or above for fats, which are solid at 20°C.

2.215 Reichert-Meissl Value — The number of millilitres of 0·1 N sodium hydroxide solution required to neutralize the steam volatile, water soluble fatty acids distilled from 5 g of an oil or fat under the precise conditions specified in the method. Reichert-Meissl Value is a measure of water soluble, steam volatile fatty acids, chiefly butyric and caproic acids, present in oil or fat.

2.216 Rendering — The term is generally applied to the treatment designed to remove all or most of the oil from fatty animal tissues or other material with a high ratio of oil to solid matter. Dry rendering is distinguished from wet rendering by the fact that exulsion of oil or fat is accompanied by dehydration of the fat and fatty tissues, so that the latter are essentially dry at the end of the operation whereas in case of wet rendering, recovery is done in presence of large amount of water. During the operation, the separated fat rises to the top of the aqueous layer and is skimmed off.

2.217 Saponifiable Matter — Material which can be saponified by caustic alkali is regarded as saponifiable matter. It is actually a calculated value and is obtained by subtracting the sum of moisture, impurities and unsaponifiable matter from 100 percent.

2.218 Saponification — Saponification is the term generally used for splitting of an ester by alkali into soap and alcohols.

2.219 Saponification Equivalent — It is the amount of fat or wax saponified by one gram equivalent of KOH and is the mean gram equivalent of the mixture of glycerides or wax esters present, on the assumption that the latter consists exclusively of neutral esters of these types. In such cases, it is related to saponification values by the formula:

$$\text{Saponification equivalent} = \frac{56\,100}{\text{Saponification value}}$$

and affords a clear indication of the mean molecular magnitude of the esters (glycerides or otherwise). In actual practice, it is generally applicable to oils or fats having not more than 2 or 3 percent of free fatty acids and less than 1 percent unsaponifiable matter.

2.220 Saponification Value — Saponification value sometime also mentioned as saponification number is number of milligrams of caustic potash required to saponify one gram of oil, fat fatty acid or wax.

2.221 Saponins — These are the glycosides that dissolve in water to form colloidal solutions, which froth copiously. On hydrolysis the saponins yield sugar and sopogenins.

2.222 Salad Oil — The term is generally used for oils, which will remain substantially liquid in a refrigerator at 0° – 7°C and produce a mayonnaise emulsion, which is stable at low temperature.

2.223 Shale Oil — A crude oil obtained from oil shale by destructive distillation followed by hydrotreating.

2.224 Shortening — Shortening are semisolid foods, prepared from fats, oils or a combination of both, which may be processed by hydrogenation or other modification process for use in cooking, baking or frying. They may contain other permitted ingredients such as emulsifiers, antioxidants and are distinct from margarine, which also contain non fat material, such as water.

2.225 Sludge — Sludge is the solid residue left out in the tanks, when crude oils are stored and shipped in the same. These are also sometime referred to as 'TANK BOTTOM' or 'FOOTS'.

2.226 Soap — The product formed by the saponification or neutralisation of fats, oils, waxes, rosin or other acids with organic or inorganic bases. In the case of ordinary soluble soaps, the hydrogen of the carboxylic group of the fatty acid is replaced by sodium or other alkali metals. Heavy metal soaps (sometime mentioned as metallic soaps) are a variation, in which metals heavier than sodium are used. They are not water soluble and used mostly for industrial applications such as lubricating greases, gel thickners, in paint driers, etc.

2.227 Soapstock — Bye products of oil refining produced by the neutralisation of free fatty acids with a base (sodium hydroxide) and consisting of a mixture of crude soap and neutral oils or fats. They are used in soap making.

2.228 Solid Fat Content — It is a measure of the amount of solids present in the sample. It is measured as the ratio of amount of liquid protons present at a given temperature to the total amount of protons (both liquid and solid) of the sample under the conditions of the measurement. Both pulsed and wide line NMR spectrometers are used for the measurement of Solid Fat Content.

2.229 Solid Fat Index — Solid fat index is an empirical measure of solid fat content and is calculated from the specific volume at various temperatures, using a dilatometric scale graduated in units of ml × 1 000.

2.230 Solvent — Solvent is a substance capable of dissolving another substance (solute) to form a uniformly dispersed mixture (solution) at the molecular or ionic size level.

2.231 Solvent Extracted Oil — Means any vegetable oil obtained from oil bearing material by the process of extraction with a solvent. The oil conforming to the quality requirements of semi-refined and refined grade is known as semi refined or refined grade of solvent extracted oil, respectively. The solvent extracted oil, which has not been subjected to any of the refining processes and conforms to the specified quality requirements is designated as raw grade I, solvent extracted oil, in Government orders on standard of quality for refined grade of solvent extracted oils.

2.232 Solvent Extraction — Solvent extraction is the name given to the process of recovery of oil or fat from any oil bearing material, with the help of solvent. The solvent most commonly used in the oil and fat industry for oil extraction is normal hexane, food grade. Solvent extracted oil means any oil obtained from oil bearing material by the process of extraction by a solvent. The deoiled meal for edible purposes, commonly known as 'solvent extracted edible flour' has been defined as the ground material obtained from specially prepared deoiled meal, that is, the residual material left over, when the oil is extracted by a solvent from oil cake immediately following the single pressing of good quality edible oil seeds.

2.233 Relative Density — Relative density is the ratio of mass of any volume of a substance to the mass of an equal volume of water at 4°C. The specific gravity of water at 4°C is 1·0. It is not a measure of the quality of oil and an oil that deviates slightly in relative density from the specified limit, but otherwise conforms is usually satisfactory.

2.234 Splitting — Splitting is the term generally used for the process of decomposition of glycerides or other esters by hydrolysis. Degree of splitting indicates the efficiency of splitting and is defined as the amount of free fatty acids expressed as percentage of total amount of fatty acid present.

2.235 Stand Oil — These are heat polymerised oils made by heating the processed raw oils to attain a specified viscosity at the desired temperature. Blown stand oils meaning stand oils that have been blown with air at some stage during their manufacture, are used for a wider range of products. When two or more oils are heat treated to increase the viscosity, the product is called a 'Mixed Stand Oil'.

2.236 Stearic Acid — Stearic acid is a white crystalline solid consisting chiefly of stearic acid (octadecanoic acid) and very small amount of palmitic acid and oleic acid. It is commercially available, as single, double and triple processed stearic acid. In pure form, it has a molecular formula $C_{18}H_{36}O_2$ with a molecular weight of 284.

2.237 Stearin — The term is generally used for solid pressed residual acids obtained during the pressing of stearic acid at ambient temperature. In technical sense, it is used for triglyceride of stearic acid.

2.238 Stearin Pitch — Is obtained from the distillation of fatty acids. It consists of sticky blackish mass, fairly hard sometime elastic, partly soluble in light petroleum. It is used in preparation of mastics, waterproof paper board and electric insulators.

2.239 Set-to-Touch-Time — Is the test used for checking the drying characteristics of drying oil. It is defined as the time required, under the conditions outlined, for the oil to reach a point where the adhesion to an external object is less than the internal cohesion of the film.

2.240 Steam Distillation — Is a simple distillation, where vapourization of the charge is achieved by blowing live steam directly through it. The process is commonly adopted in the processing of oils and fats to remove the volatile odoriferous components from an oil or fat and is termed as deodourisation or steam stripping of an oil. When the objective is to distil off the fatty acids by steam stripping, it is commonly termed as steam deacidification or physical refining.

2.241 Sterol — A group of unsaturated monohydric alcohols with perhydrocyclopentanophenanthrene ring system as basic skeleton, and a high molecular mass. They exist abundantly both in the animal (zoo sterol) and vegetable (Phytosterol) kingdom. Cholesterol is the most important sterol.

2.242 Sulphonated Oil — A vegetable or animal oil/fat which has been treated with sulphuric acid so as to introduce a sulpho-group 'SO_2OH'. The excess of acid is washed out and the oil is neutralised with alkali. These oils are soluble or emulsifiable in water. They are used as textile assistants, cutting oils, leather filling agents, floatation agents, etc.

2.243 Sulphurised Oils — All oils which have been treated with sulphur or sulphur chloride to cause polymerisation in the molecule. They are used for antirust paints and varnishes.

2.244 Suet — Suet or beef fat means fat obtained from a beef carcass.

2.245 Synergism — Synergism is a chemical phenomenon, in which the effect of two active components of a mixture is more than additive, that is, it is greater than the equivalent volume or concentration of either component alone. A substance that induces this result, when added to another substance is called a synergist.

2.246 Tall Oil — It is a byproduct obtained on sulphite digestion of wood pulp during kraft paper manufacture. It consists mainly of rosin acids, fatty acids and other unsaponifiable materials. Distilled tall oil products containing less than 90 percent fatty acids are defined as 'resin tall oils'.

2.247 Tall Oil Fatty Acid — Tall oils other than crude containing at least 90 percent of fatty acids not including rosin acids.

2.248 Tallow — It is the rendered fat obtained mainly from beef, sheep, goat, etc, carcass trimmings from the slaughter house.

2.249 Tallow Oil — (Inedible oleo oil) It is a yellowish liquid which smells of tallow and is used for soap making in lubricants.

2.250 Tallow Stearin — It is also known as oleo stearin (pressed tallow) and is the harder part which remains after the extraction of oleo oil or tallow oil and consists mainly of glycerides of stearic and palmitic acid.

2.251 Tampering — Tampering is the term generally used for the process of holding the packaged shortening for a few days at the temperature it was maintained at the time of packing.

2.252 Technical Grade Refined Oils — These include a wide variety of oils, that are specially refined and further processed to meet the requirements or specifications for a definite industrial use.

2.253 Texturising — Is the treatment given to a shortening by rapid cooling in a scraped surface internal chilling machine and whipping the cold partially crystallised fat with air or nitrogen.

2.254 Tinning Oil — The term is generally used for oils, used in the tin plate industry to give a protective coating to prevent atmospheric oxidation of the hot metal.

2.255 Titre — The highest temperature attained under standard conditions, during the solidification of the mixed fatty acids obtained from the oil or fat.

2.256 Thiocyanogen Value — Thiocyanogen value is a measure of the unsaturation of fats or oils and is expressed in terms of the equivalent number of centigrams of 1 percent iodine adsorbed per gram of the sample. It is applicable to all normal fats and oils not containing conjugated system.

2.257 Toasting — The term commonly but erroneously applied to the processes (wet) of cooking of meal by atmospheric or pressure method, for the purpose of increasing the protein efficiency of these products or improving their functional property and/or improving physical texture.

2.258 Tocopherols — These are the natural antioxidants found in vegetable oils. Tocopherols are also known as Vitamin E, the most active of them being α-tocopherol.

2.259 Totox Value — Totox value is an index of degree of oxidation in which the peroxide value and the anisidine value are combined.

$$\text{Totox value} = 2\ \text{Peroxide Value} + \text{Anisidine Value}$$

2.260 Trans-Esterified (or Interesterified) Oils — The consistency of an oil or fat can be increased by suitable re-arrangement of the fatty acid radical on the triglyceride contained in the product. The necessary interaction and re-arrangement of the esters is stimulated by the use of catalysts.

2.261 Unsaponifiable Matter — The fraction of substances in oils and fats which is not saponified by caustic alkali, but is soluble in ordinary fat solvents. It includes the higher aliphatic alcohols, sterols, pigments, hydrocarbons and resinous matter.

2.262 Vanaspati — Vanaspati means a blend of deacidified, bleached, subjected to process of modification including partial hydrogenation and deodorized edible vegetable oils with specified quantity of refined vegetable oil(s) meant for human consumption.

NOTE — However, according to Vegetable Oil Products (Control) Order, 1947, 'Vanaspati' means hydrogenated vegetable oil meant for human consumption.

2.263 Varnish Linseed Oil — Varnish linseed oil is a brownish yellow linseed oil free of break when tested with glycerol and has an acid value below 0·5. Water white varnish linseed oil is produced by bleaching the alkali refined oil with adsorbents. Another type of refined linseed oil is 'Non break linseed oil' manufactured by aqueous washing of raw linseed oil.

2.264 **Vegetable Oils** — Vegetable oils are the oils obtained from seeds, fruit and other oil bearing material of vegetable sources and are generally considered to be mixtures of mixed glycerides.

2.265 **Vegetable Oil Product** — Means any vegetable oil subjected to a process of hydrogenation in any form, or an admixture thereof with any substance for edible purposes.

2.266 **Viscosity** — Viscosity is the internal resistance of a fluid to flow at a specified temperature. It is a definite measurement for the consistency of a material.

2.267 **Votator** — The term is used for the scraped surface tube cooler and similar machinery meant for cooling and crystallising fats and their blends for production of texturised fat based products such as shortening, margarine, etc.

2.268 **Wax** — A low melting organic mixture or compound of high molecular weight, solid at room temperature and generally similar in composition to fats and oils, except that it contains no glycerides. Some are hydrocarbons, others are esters of fatty acids and alcohol. They are classified among the lipids and are generally non-greasy to touch. The process of removal of wax from vegetable oils improves the clarity of oil and is mentioned as dewaxing.

2.269 **Whale Oil** — Is a marine oil obtained from whale and is offered in the market in a number of grades depending upon the quality and end use.

2.270 **Wiley's Melting Point** — Wiley's melting point is the temperature at which under the conditions of this test, the sample disc assumes a spherical shape and is thus an index of the temperature at which the sample is melted.

2.271 **Winterising** — Winterising is the process of removing from the oil certain constituents or impurities, which though soluble at medium and high temperature, crystallise and make the oil turbid or cloudy in cold weather.

2.272 **Wool Combing Oil** — The term is generally used for oils required as lubricant or softener for the woollen fibre. Treatment with such oils, facilitates the passage of yarn through the looms and reduces its liability to snap during the spinning and weaving processes.

2.273 Wool Fat — Is the fat obtained from raw wool during the process of 'scouring'. This is also sometime termed as wool grease.

2.274 Wool Grease — Is a sticky fat, with a disagreeable odour, extracted from the soapy water in which the wool has been scoured or cloth fulled. It may also be extracted from greasy wool by means of volatile solvents. Chemically it is a wax rather than fat due to its non glyceride character. When wool grease is steam distilled and pressed it separates into a liquid, a solid and a residue.

The liquid is known as wool grease oleine and is used as a textile greasing agent in spinning mills.

The solid part, wool grease stearin is a waxy substance and is used in leather industry, preparation of lubricants, etc.

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